2019

Medical Students' Knowledge, Confidence, and Empathy Towards Dementia and Caregiver Stress

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MEDICAL STUDENTS KNOWLEDGE, CONFIDENCE, AND EMPATHY TOWARDS DEMENTIA AND CAREGIVER STRESS

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Submitted in Partial Fulfillment of the Requirements for the Degree of

Doctor of Psychology

May 2019

PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the thesis presented to us by _____

on the _____ day of _____, 20___, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

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Acknowledgements

I would like to thank my committee members, Dr. Donald Masey, Dr. Robert DiTomasso, and Dr. Katherine Galluzzi, for their guidance and support throughout the dissertation process. To Dr. Masey, thank you for riding this wave with me, and always being supportive and encouraging through the process. I would not have been able to get through this without your knowledge, guidance and support. To Dr. DiTomasso, thank you for all of your help, especially with the statistics aspect of this study. Your willingness to jump in towards the end was/is greatly appreciated. To Dr. Galluzzi, your knowledge and help throughout the course of this process has been greatly appreciated and valued. I truly appreciate how involved you were during the process. Additionally, I would like to thank Dr. Stephen Scheinthal from Rowan School of Osteopathic Medicine for helping me through the process of obtaining data from their institution and providing additional support.

To my family, I know this has been a long journey to get to this point, and I thank you so much for sticking it out with me. I would not have been able to get through these last 5 years without your love, support, and encouragement. To my mother Linda, your undying love and support has never gone unnoticed. Thank you for always believing in me, and giving me the strength and confidence to not only reach my goals, but go beyond them. I would not be where I am without you. To Joe, your support through this process has been incredible, and always appreciated. You mean the world to me, and having your support through this journey has made stressful times much easier.

Last, I would like to thank my friends, co-workers, classmates and supervisors. This is not an easy process, but we have gone through it together and came out the other

end. My fellow interns, I will always be grateful for the laughs and friendships we have formed. I will always be eternally grateful for everyone who has been there through the doctorate journey!

Abstract

Early diagnosis of dementia and dementia-related illnesses provides increased time for treatment, which is aimed at maintaining patient function and delaying decline (Teel, 2004). Empirical studies have shown a decline in empathy during undergraduate and graduate medical education (Hojat et al., 2009). This study examines differences between 2nd and 4th year Doctor of Osteopathic Medicine (DO) students' knowledge, empathy and confidence in working with individuals diagnosed with dementia and addressing caregiver stress. Students from Philadelphia College of Osteopathic Medicine and Rowan University School of Osteopathic Medicine completed an online survey which included the Knowledge in Dementia Scale (KIDE), Jefferson Scale of Empathy-Medical Student Version (JSE-S), Confidence in Dementia Scale, and a vignette focused on caregiver stress. Data analysis included165 individuals who met inclusion criteria and completed the survey. Findings indicated no significant difference between 2nd year and 4th year DO students' levels of knowledge. However, the 2nd year cohort reported higher levels of empathy and lower levels of confidence compared with the 4th year students, who reported lower levels of empathy and higher levels of confidence in working with caregivers and patients with dementia. There was a positive correlation between higher levels of empathy and rating the vignette as stressful for the patient caregivers. These findings highlight the need for continued education and dementia care skill building for medical students. This research address implications for medical education and proposes that future research include continuity examination of a cohort of students over the course of medical education to better delineate the factors contributing to the observed changes.

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Chapter 1: Introduction

Statement of the Problem

The process of aging for an individual comes with many different, new adjustments and stages of life. When aging becomes complicated by additional areas of cognitive and behavioral difficulty, many individuals struggle with adjusting to a life in which they have less control over daily functions. One particular group of disorders which afflicts individuals later in life is dementia. Dementia is characterized by changes in three main areas: cognitive dysfunction, psychiatric and behavioral problems, and reduced ability to perform activities of daily living (ADLs). Areas of cognitive dysfunction include memory, language, attention, thinking, orientation, calculation and problem solving (Quinn, 2014). Basic ADLs include dressing, bathing/grooming, ambulating, toileting and feeding. Individuals with dementia are also likely to develop difficulty with Instrumental ADLs such as using transportation, shopping, bill paying, meal preparation and other activities involving executive function. (Katz, Lawton-Brody et al.)

Only 40% of primary care physicians report assessing their patients for cognitive impairment when seeing them for other circumstances (Day, et al., 2012). The most frequently reported barriers to addressing cognitive impairment were time constraints and lack of reimbursement (31.9%), limited scientific evidence or proven treatments (26.3%), and patients' more immediate health issues (24.6%) (Day, et al., 2012). Due to comorbid medical issues, the elderly population has increased visits to physicians; however, research shows that only 40% of physicians are assessing the possibility of declining cognitive function or behavioral changes in these patients.

Early diagnosis of dementia and dementia-related illnesses provides increased time for treatment, which is aimed at maintaining patient function and delaying decline (Teel, 2004). Additionally, early intervention in this population allows for family members to become fully educated on the disease and what is needed for continued management. Physicians are encouraged to consider seven Dementia Care Protocols including formal memory testing, imaging, laboratory testing, interventions, counseling, community service, and specialist referrals (Sivananthan, Puyat & McGrail, 2013).

Despite research showing the importance of early diagnosis and access to support to help maintain patient functioning, many individuals' family members report not receiving the support they feel they need from their loved ones' physicians. Primary Care Providers (PCPs) are reluctant to work with these patients to their fullest capability and to give their full attention to the diagnosis (Mason, et al., 2016). In a study measuring physicians' perceptions of their role in treating Dementia-related behavior problems in nursing homes, physicians reported feeling as though their current and ideal role would be only to determine if the individual has a medical problem that could be causing their behavior changes (Cohen-Mansfield & Jensen, 2008). Additionally, they stated that the least important aspect of their role as the treating physician was a referral to a mental health specialist (Cohen-Mansfield & Jensen, 2008).

Mason et al. (2016) speculates that the observation of physicians not giving their full attention to this population may be due to negative attitudes in working with a disorder with no cure. PCPs state that they feel hesitant to identify and make a formal diagnosis of dementia for a patient and are also hesitant to refer the patient to a more qualified medical specialist (Mason, et al., 2016). Because physicians are reporting hesitance both

in working with and in referring this population for more specialized services, affected individuals and their family members are left to fend for themselves in terms of services and support that is so desperately needed.

First experiences with the geriatric population and dementia related concerns happen while in medical school. One of the most common issues medical students report having with dementia patients is empathy. Empirical studies have shown a decline in empathy during undergraduate and graduate medical education (Hojat, Vergare, Maxwell, Brainard, Herrine, Isenberg & Gonnella, 2009). Research done by Chen and colleagues reported a decline in the empathy score measured by the Jefferson Scale of Empathy, JSE, in third year medical students as compared with second year students (Chen, Lew, Hershman & Orlander, 2007). Hojat and colleagues (year) found statistically significant results showing that mean empathy scores during medical school were at the lowest at the end of the third year, with orientation day at 114.3, end of year one at 115.8, end of year two at 115.7, end of year three at 108.5 and end of year four at 110.5.

Family members caring for loved ones with cognitive and/or behavioral decline are reporting that dementia symptoms have been mistaken for depression, midlife concerns, marital conflict or psychiatric conditions. This reflects the fact that PCPs state that they ideally would play a minimal role in working with the dementia population, and additionally, they self-report not giving their full attention to these clients; hence, these caregivers have not received much support (Diehl-Schmid, et al., 2013). Caregivers must care for a family member lacking an appropriate diagnosis of dementia; these may show diminished, if not inappropriate emotions, apathy, lack of self-awareness and difficulty with communication, all of which can damage the relationship (Caceres, et al., 2016). In

previous research, caregivers report that what is helpful to them is information about the disorder, psychosocial support by trained personnel, and outside of the home assistance (Diehl-Schmid, et al., 2013). Additionally, they believe that a complete and thorough explanation of the diagnosis and continued support by a doctor who understands the disease process would be beneficial in alleviating some of the stress and burden (Diehl-Schmid, et al., 2013). There is a plethora of research on the topics of caregiver stress and physicians' perceptions of dementia, but little is known about medical students' attitudes towards dementia, or about their perceptions and attitudes about the unique caregiver stress associated with dementia.

Purpose of the Study

Although much of the literature on attitudes about dementia focus on practicing physicians who have years of experience working with the population, little is known about medical students' attitudes and understanding of dementia or caregiver stress for this population. This present study examined the relationship between medical students' knowledge of and attitudes towards dementia and the stress of caregivers. Because the research shows mixed results, this study helped to clarify if medical students are experiencing negative or positive attitudes, and will elicit their abilities to recognize a stressful situation for caregivers of this population. A better understanding of these factors may help to ensure that medical students receive the optimal amount of support and education which will assist them in developing strategies for working with this population in a caring, informed and confident fashion during their medical careers.

Chapter 2: Literature Review

Dementia Overview

As of 2015, 47 million people worldwide are struggling to cope with progressively debilitating effects of dementia (Dementia: Turning fine aspirations into measurable progress, 2015). Dementia is a syndrome in which multiple cognitive impairments are severe enough to significantly impact everyday functioning (Quinn, 2014). For a DSM-5 diagnosis of dementia, one must have memory impairment, and one additional area of cognitive impairment including aphasia, apraxia, agnosia, and executive functioning. In 2010, dementia was estimated to affect 35.7 million people, which means in a five year span, approximately ten million additional people were affected (Quinn, 2014). A diagnosis of dementia increases mortality risk and leads to a debilitated state.

The cause of dementia involves damage of the nerve cells in the brain, which can occur in several different areas of the brain. How a person develops symptoms depends on the area of the brain affected by the nerve damage. The different forms of dementia are grouped, based on the areas of the brain that have been affected.

After a review of 323 studies on risk factors for developing dementia, the following risk factors have been compiled: heavy cigarette smoking (operationalized as being between 55.5 and 156 packs a year), high blood pressure, depression, carotid atherosclerosis, low education level, high total homocysteine levels, neuroticism, and frailty (Rae-Grant, Fedorowicz & Ehrlich, 2017). Additionally, a review of 62 observational studies looking for modifiable risk factors for conversion to dementia in patients with mild cognitive impairment showed that neuropsychiatric symptoms and diabetes were associated as increased risk of dementia in individuals with mild cognitive impairment (Rae-Grant, Fedorowicz & Ehrlich, 2017).

The most common type of the dementia disorders is Alzheimer's disease (AD). AD presents with progressive memory impairment, which involves executive and visuospatial functioning (Quinn, 2014). When diagnosing, there should be no other cause of cognitive impairment, such as delirium or psychiatric disorder, which can often mimic the symptoms of dementia. Additionally, there may also be behavioral changes which interfere with functioning, such as aggressive behavior and illegal behavior. Often, individuals meet the criteria for more than one form of dementia, or meet criteria for one specific form of dementia, but have biomarkers present for a different one (Quinn, 2014). Psychiatric and behavioral symptoms include depression, hallucinations, delusions and agitation. Alzheimer's disease comes in two distinct forms, an early onset form that is genetically determined, and a late onset form that is not. The predominant characteristics of the neuropathology associated with the late onset form of AD are neuritic senile plaques and neurofibrillary tangles (Balin & Hudson, 2014).

Approximately 12.5% of adults over the age of 65 are diagnosed with Alzheimer's disease, making that 5.1 million Americans. Of that 5.1 million, only 65,000 had dementia listed as the cause of death in 2004. Dementia diagnoses will cost $600 billion dollars worldwide (Dementia: Turning fine aspirations into measurable progress, 2015).

Vascular dementia is the second most common type of dementia, which occurs when there is damage to the vessels that supply blood to the brain after a vascular episode has been deemed to be present (Quinn, 2014). This form of dementia has an acute onset and stepwise decline, with focal neurological symptoms. Merely having vascular risk factors is not enough for an individual to be diagnosed with this form of dementia. The

brain's parenchyma has to be damaged by infarcts in order for a proper diagnosis to be made (Quinn, 2014). Additionally, changes to diffuse white matter, also known as leukoaraiosis, can lead to vascular cognitive impairment (Quinn, 2014).

Less common is Lewy body dementia, a progressive dementia severe enough to interfere with normal social and occupational function (Walker, Possin, Boeve & Aarsland, 2015). This form of dementia produces deficits in attention, executive functioning, and visuospatial abilities. Core features of this dementia include fluctuating cognition, recurrent visual hallucinations, and spontaneous Parkinsonism. Lewy body dementia is classified as having α-synuclein neuronal inclusions, accompanied by neuronal loss (Walker, Possin, Boeve & Aarsland, 2015). What is referred to as Parkinsonism in Lewy body dementia occurs in the absence of the rest tremor, and does not respond to dopaminergic drugs. Patients with Lewy body dementia initially present with cognitive impairments, and often extrapyramidal symptoms (EPS), although EPS is not required for a diagnosis (Gnanalingham, Byrne, Thornton, Sambrook & Bannister, 1997).

Frontotemporal dementia may present in an individual who has a language impairment or a behavioral variant (Quinn, 2014). Progressive aphasia due to frontotemporal dementia is characterized by progressive non-fluent speech or a loss of knowledge of the meaning of items. This form of dementia typically has a young onset and behavior changes are primarily the first symptoms to emerge (Quinn, 2014). Criteria for behavior variant frontotemporal dementia (bvFTD) includes prominent behavioral features such as disinhibition, apathy, loss of sympathy and empathy, compulsions, hyperorality and deficits in executive functioning (Quinn, 2014).

Interventions for Dementia

Possibly the most important aspect of intervention for the dementia population is decision making capacity and safety, specifically driving safety (Dementia: Turning fine aspirations into measurable progress, 2015). Evaluations can be done to ensure that an individual diagnosed with dementia is still able to comply with driving safety laws, and that functions such as processing speed and sustained attention are intact. Although it will come as a blow to the person's independence, it is important to make sure that the individual is not putting him or herself or others at risk. Exercise programs have been shown to improve cognition, as well as ability to perform ADLs. Participants in a study looking at the effects of exercise on the Alzheimer's population reported that physical activities are appreciated and meaningful, and that these give them a sense of relaxation and pleasure (Cedervall, Torres & Åberg, 2015). Previous studies have found that physical activity, including walking, improves brain health, decreases symptoms of depression among older adults, and moderates stress levels in dementia (Cedervall, Torres & Åberg, 2015). Some psychological interventions can be used to assist with lessening anxiety and depression, as well as cognitive stimulation to improve quality of life and communication in patients with mild to moderate dementia.

One therapeutic approach being utilized in long term care homes for these populations are Snoezelen rooms. When in this room, individuals are exposed to the effects of touch, lights and colors, sounds, smells and tastes to stimulate and to soothe (Klages, Zecevic, Orange & Hobson, 2011). This room is beneficial because it is a sensory environment that places few demands on complex cognitive abilities but capitalizes on remaining sensorimotor capacities of people with dementia.

When looking at clinical dementia guidelines, there is sufficient evidence for the efficacy of some drugs, such as cholinesterase inhibitors, in the symptomatic therapy (Holle, Grässel, Ruckdäschel, Wunder, Mehlig, Marx & Lauterberg, 2009). These drugs aim to delay the disease progress. On the contrary, the evidence for nonpharmacological interventions is inconclusive; this could be for a variety of reasons such as intervention types, population, settings, study designs and outcomes (Holle, Grässel, Ruckdäschel, Wunder, Mehlig, Marx & Lauterberg, 2009).

Cholinesterase inhibitors appear modestly effective for mild to moderate Alzheimer disease in terms of cognitive outcomes, activities of daily life and behavior changes. Donepezil (Aricept™), galantamine and rivastigmine, are approved for the treatment of mild to moderate dementia (Small & Bullock, 2011). This class of medications has been proven to be effective in 3 different domains of functioning: activities of daily living, behavior, and cognitive functioning (Small & Bullock, 2011). Postmortem research indicates that neocortical cholinergic deficits, which cholinesterase inhibitors aim to combat, are minimal in mild dementia stages and do not progress until later in the course. Thus, patients with more severe dementia tend to exhibit greater treatment response to cholinesterase inhibitors than those with a mild form of the disease (Burns, Spiegel & Quarg, 2004).

Memantine (Namenda™), a low to moderate affinity N-methyl-D-asparate receptor antagonist, is also available for dementia treatment (Wong, 2016). It works by regulating the activity of glutamate to prevent overstimulation from the receptor caused by excessive glutamate. This medication has been approved in the United States and Europe for moderate to severe AD dementia. Benefits of memantine were noted for up to 26 to

28 weeks in patients, and it demonstrated a consistent benefit on behavioral outcome with delusion, agitation, aggression, and irritability (Wong, 2016).

Recent research has shown that there is a connection between dementia and nicotine acetylcholine receptors in the brain. Alzheimer's disease includes a loss of cholinergic tone and acetylcholine levels in the brain, which are thought to be responsible for the cognitive decline in the Alzheimer's brain (Lombardo & Maskos, 2015). Current medication is used only to enhance cholinergic signals, but the nicotinic acetylcholine receptor family (nAChR) and the muscarinic acetylcholine receptor family (mAChR) are also affected. Alpha 7 agonists used to target the nicotinic acetylcholine receptor may be a promising approach to the treatment of dementia (Lombardo & Maskos, 2015).

Many physicians initiate treatment during the early stages of dementia because it has the greatest possibility to improve long-term outcomes. Treatment is directed at preserving the patients' functional levels while cognitive symptoms and impairment of daily living are still in the mild stages (Small & Bullock, 2011). Despite recognition of the importance of beginning treatment in the early stages, an estimated 50% of primary care patients are not being diagnosed by their PCPs, and those individuals are not being diagnosed until moderate symptoms have developed (Small & Bullock, 2011). Patients, families and physicians seem reluctant to recognize and diagnose dementia due to it being a serious, progressive condition without a cure, and also with a stigma (Small & Bullock, 2011). Small & Bullock, (2011) report a nihilistic approach, the belief that nothing can help, in the treatment of dementia. Evidence suggests that this attitude may be on the decline, however.

Education and counseling about the basis of the disease can offer some relief to frustrated friends and family members when it comes to adjusting to the changes (Pressman & Miller, 2014). Safety is a serious concern due to the possibility of impulsivity and impaired judgment. Financial guidance and driving safety need to be addressed as the course of the disease plays out. Exercise has been shown to benefit mood, cognition, and overall health in patients with dementia (Pressman & Miller, 2014). Speech therapy may have some benefits for individuals with language deficits, and problematic behavior can be handled with a combination of redirection, distraction and simple choices (Pressman & Miller, 2014). Most people benefit from a structured environment.

Caregiver Stress Associated with Dementia

As previously mentioned, there is a high level of deterioration in daily function that occurs with progression of dementia, making caregiver stress and burden more prevalent than with other diseases. The cognitive, behavioral and affective losses associated with this progression make it more difficult and burdensome than caring for loved ones with other chronic conditions (Ory, Hoffman, Yee, Tennstedt & Schulz, 1999). Research has found that dementia caregivers are more involved than non-dementia caregivers in number of hours per week they spend on caregiver tasks, as well as number of daily living tasks with which they assist. They are more negatively affected by their responsibilities in terms of employment complications, caregiver strain, mental and physical health problems, time for leisure and for other family members, and family conflict (Ory, Hoffman, Yee, Tennstedt & Schulz, 1999).

Son, Erno, Shea, Femia, Zarit & Stephens (2007) found that exposure to chronic stress of caregiving can lead to changes in an individual's sympathetic arousal and cardi-

ovascular reactivity. These changes can produce a predisposing risk for hypertension and cardiovascular disease. Also, self-care behaviors are often not exercised by caregivers due to the high demands on time and energy. They may start to neglect their own self-care by sleeping less, eating too much or too little, not exercising, or not managing their own health problems (Son, Erno, Shea, Femia, Zarit & Stephens, 2007).

Caregivers become the primary resource for transporting dementia patients to and from their doctors' appointments due to the patients' cognitive decline. They may also take on the roles of decision maker and treatment planner. At some point, the physicians managing care must start working with the family members more and with the patient less.

Primary Care Providers and Dementia

Primary Care Providers (PCPs) play a unique role in diagnosing dementia because they are generally the first physicians that individuals visit when they are experiencing any type of cognitive decline or behavior changes. It has been long established that a PCP plays a key role in early identification and subsequent management of dementia (Milne, Hamilton-West & Hatzidimitriadou, 2005). Detection rates for dementia vary between state to state, and country to country. In Sweden, it has been reported that the detection rate of dementia by general practitioners is 25%, but in Australia the rate is 50% (Milne, Hamilton-West & Hatzidimitriadou, 2005). Physicians take on the role of primary doctor for individuals with dementia, and are often left to oversee the long-term care for the individual. They are in the position to diagnose, make decisions about clinical care, and influence the use of services such as home based supports and nursing homes (Sivananthan, Puyat & McGrail, 2013).

Identifying individuals who show the initial changes of Alzheimer's disease and initiating appropriate interventions early in the course of the disease, when there is still time for them to benefit, is one of the main challenges of physicians and other clinicians who care for older persons (Galluzzi, Appelt & Balin, 2010). Dementia is, categorically, one of the more difficult diagnoses to impact because there is no good prognosis for the individual. For this reason, PCPs, who are the first to come in contact with these individuals under most circumstances, are reluctant to work with these patients to their fullest capability and give their full attention to the diagnosis. (Mason, et al., 2016). Milne, Hamilton-West & Hatzidimitriadou (2005) state that reasons for reluctance to diagnosis dementia are grounded in physicians' concerns that making an accurate diagnosis is difficult, treatment options are limited, and that it may cause undue stress to the patient. General practitioners state that they feel hesitant to identify and make a formal diagnosis of dementia for a patient and are also hesitant to refer the patient to a more qualified medical specialist (Mason, et al., 2016).

Attitudes towards dementia are also reported as key determinants of physician engagement with a possible presentation of dementia (Mason et al., 2016). Mason, et al., 2016 cite that Kaduszkiewicz et al. found that physicians with a negative attitude towards caring for patients with dementia reported a lack of belief in their ability to improve the patients' quality of life, but the opposite was true for those with a positive attitude. Because of these findings, researchers developed the General Practitioner Attitudes and Confidence Scale (GPACS–D) for dementia and used as a way of looking at attitudes and perceptions about working with this population. The scale looks at multiple components including confidence in clinical abilities, support for quality of life and care, communica-

tion about dementia progression, and fears and frustrations. All four of these areas displayed moderate to good internal consistency, which suggests that they do accurately reflect their underlying constructs (Mason, et al., 2016).

In a study on rural physicians‘ practices for early diagnosis of dementia, physicians reported that they often rely on the family members' recognition of symptoms as a way of early detection (Teel, 2004). They face limitations when working with the population that includes limited access to outside support and consultations, and non-existent community support and educational resources. The physicians believed this greatly impeded their ability to diagnose dementia accurately and in a timely manner (Teel, 2004). These physicians also reported that if the family members were absent or uncooperative, they had challenges; but if the family members were present and supportive, the patient care experience was improved.

In the past, families have expressed concern over interactions with physicians regarding their loved ones' diagnoses. In research interviews, families report that physicians frequently do not recognize or diagnose dementia in their patients (Maslow, Selstad & Denman, 2002). Maslow, Selstad & Denman (2002) also report that families say they were given their relatives' diagnoses and were informed that there was nothing to be done and that they should spend some time looking for nursing homes for their loved ones. Additionally, some reported that they were not given any information about dementia, available medicines, or ways of managing behavioral symptoms the individual may be experiencing.

Some physicians reported that they are, indeed, unsure of their ability to diagnose dementia properly, and are skeptical about the value of diagnosing these conditions be-

cause they believe the diagnoses convey a hopeless prognosis and that there is nothing to do for the patient and family (Maslow, Selstad & Denman, 2002). Physicians state that they are particularly uncomfortable giving advice about behavioral symptoms and say there are no effective treatments for the conditions (Maslow, Selstad & Denman, 2002). Due to this, families felt abandoned and felt as though they lacked the advice needed to help their family members in the best way possible (Maslow, Selstad & Denman, 2002).

More recent studies on physician practices indicate that there is a variation in screening methods and responses regarding the care processes of dementia (Sivananthan, Puyat & McGrail, 2013). Sivananthan, Puyat & McGrail, report that there is a large body of literature on physician perceptions in regard to dementia, but a smaller number of studies on physician care practices. With the possibility of varying practices in diagnosis and treatment that differ from the guidelines recommended, poor detection and management could put people with dementia in a position to lack resources in psychosocial interventions, routine monitoring or multidimensional approaches to addressing cognitive and functional challenges (Sivananthan, Puyat & McGrail, 2013).

One thousand, two hundred and sixty four studies were identified in 2013 in an initial search of physicians and dementia, but for Sivananthan, Puyat & McGrail's specific research question, 1,222 were excluded for various reasons; these included studies that addressed caregiver practice, and qualitative studies, and studies that looked at physician prescription patterns only. After additional clarification, 12 studies met the final inclusion criteria. A wide variation was seen in the formal memory testing process within the studies, with higher proportions of physicians assessing mental status, but not formal or written memory tests (Sivananthan, Puyat & McGrail, 2013). Consensus guidelines rec-

ommend brain imaging and blood work as a diagnostic aid, and 33% of physicians in this study reported using imaging tools. The proportion of physicians who reported providing some form of counseling was more than 80%, whereas community service referrals ranged from 26% to 83% within studies. Newer studies, after 2000, reported higher rates of specialist referrals, ranging from 12% to 81% (Sivananthan, Puyat & McGrail, 2013).

Medical Students Education about Dementia

With the increase in the older adult population mirroring the increased incidence of people living with dementia, health care educators are looking at the training of health care professionals. Early career professionals, including medical, nursing, pharmacy, and social work, report struggling when it comes to issues that may arise with dementia and end of life care (Nguyen, Jansen, Hughes, Rasmussen & Weckmann, 2015). The care of patients with dementia is an often complex and challenging task, which requires various skills that not all physicians feel comfortable utilizing.

According to the American Academy of Neurology (AAN), there is a shortage of practicing neurologists in the United States, which is estimated to worsen from one in 18,000 to one in 21,000 by year 2020 (Kamour, Han, Mannino, Hessler & Kedar, 2016). The cause of this shortage, in part, has been attributed to a limited number of residency positions for 4th year medical students. The 2015 match provided by the National Residency Match Program (NRMP) reported that 7.6% of 4th year US medical students applied to a residency position for one of 10 brain related programs, including child neurology, medicine-neurology, medicine-psychiatry, neurodevelopmental disorder, neurosurgery, adult neurology, pediatric triple board, psychiatry, psychiatry-family medicine and

psychiatry-neurology (Kamour, Han, Mannino, Hessler & Kedar, 2016). Of that 7.6%, only 5.1% matched into one of those specialties.

Interdisciplinary research has been done to look at the influence of personality, values, and economic factors on the specialty choices of medical students (Li, 2018). Variables that have been associated with one's intended career choice have been close or have been related to altruism, including agreeableness and empathy. These types of traits have been found to be associated with choosing more "humane" fields such as Psychiatry, Internal Medicine, and Pediatrics (Li, 2018). One study by Li, (2018), found that medical students with lower degrees of altruism were more likely to choose high-income specialties, defined as having an annual average income ≥$300,000.

Ralph Jozefowicz introduced a term referred to as "neurophobia," which he stated was "a fear of the neural sciences and clinical neurology that is due to the students' inability to apply their knowledge of basic sciences to clinical situations" (Kamour, Han, Mannino, Hessler & Kedar, 2016, pg. 313). This is one possible reason the authors hypothesize for the sparsity of medical professionals and medical students choosing specialties in brain related sciences. Additionally, they mention life experiences and financial well-being as influences in specialty training (Kamour, Han, Mannino, Hessler & Kedar, 2016).

After looking at 1167 medical trainees, which included 482 medical students and 685 house staff, using a 46 question self-administered questionnaire, they found that the most important self-reported factors for developing an interest in brain related specialties was previous neuroscience experiences, neuroscience courses in medical school, current debt level, annual personal household income and parents' education level (Kamour,

Han, Mannino, Hessler & Kedar, 2016). Additionally, they found that 30% of participants in the study reported having the idea of "neurophobia," this being the main reason why they have a lack of interest in brain related disorders. Little to no aptitude, "complicated" and difficult training were also listed as the most important self-reported factors for participants not developing an interest in these specialties (Kamour, Han, Mannino, Hessler & Kedar, 2016).

Continuum: Lifelong Learning in Neurology is a publication published by the American Academy of Neurology for continuing education in the field (Isaacson, Safdieh & Ochner, 2011). It is published six times per year and includes a variety of issues for continuing education; these include diagnostic and treatment outlines, case studies, and patient problem solving. This Continuum has been specifically developed for practicing clinicians, but information in this structured, evidence-based manner could be particularly helpful for medical students. Due to this, a medical student version of the continuum was developed, and dementia was chosen as the topic because it was next in the series to be published (Isaacson, Safdieh & Ochner, 2011). An initial pilot study was performed, suggesting that the medical student version led to increases in medical knowledge.

A single-blind. randomized control trial incorporated a 2x2 mixed factorial design to assess the effectiveness of the continuum in providing additional knowledge based resources for medical students (Isaacson, Safdieh & Ochner, 2011). Third and fourth year medical students at the University of Miami Miller School of Medicine and the Joan and Sanford I. Weill Medical College of Cornell University, a total of 226 medical students enrolled in the study. The students completed the curriculum and were assessed, using a combination of multiple choice questions and fill in the blank questions. They found that

students who received the curriculum scored higher on the post testing and had greater score increases from pre to post testing (Isaacson, Safdieh & Ochner, 2011). These findings suggest that medical students who receive additional training and teaching material on dementia have an increased knowledge and skill set for this population.

Medical Students Attitudes about Dementia

An attitude is defined by Merriam Webster Dictionary as a settled way of thinking or feeling about someone or something, typically one that is reflected in a person's behavior. Care for the elderly requires specific knowledge, attitudes, and skills that develop through medical school, through post graduate training, and is culturally diffuse (Muangpaisan, Intwalapapron & Assantachai, 2008). Previous studies have shown that medical students have mixed attitudes towards the elderly and their care, but also have a low interest in working in geriatric medicine (Muangpaisan, Intwalapapron & Assantachai, 2008). Muangpaisan, Intwalapapron & Assantachai (2008) report that the change in attitude may emerge when the students are exposed to elderly patients in their medical rotations. The aim of their study was to look at the difference in attitudes toward care of the elderly between medical students prior to exposure to elderly patients, and later, as residents in training after a few years of clinical exposure (Muangpaisan, Intwalapapron & Assantachai, 2008).

A distinguishing factor about this study is that the participants were medical students and residents in Thailand. The researchers did not find any significant differences between the medical students' and residents' attitudes towards the elderly, which was different from what previous research showed to be true. The researchers hypothesize that

this can be explained by the Asian culture, by their views towards the elderly and "respecting their seniors."

When looking at young professionals' ideas of those skills that are important when working with the dementia population, 94 medical, nursing, and pharmacy students were given open and closed ended questions to look at attitudes related to caring for dementia patients at the end of life, and those skills and knowledge that were needed to provide them with the best form of care (Nguyen, Jansen, Hughes, Rasmussen & Weckmann, 2015). Many common issues emerged from the study including knowledge, patience, empathy, understanding, compassion, medication knowledge, respect for patient autonomy, communication, and quality of life (Nguyen, Jansen, Hughes, Rasmussen & Weckmann, 2015). Medical students mentioned compassion more frequently as a crucial skill than did pharmacy students.

Conflicting research results have emerged in the area of medical students and their changing attitudes about dementia over the course of their medical programs. Some research on the topic of medical students and their attitudes about dementia has found that when medical students are exposed to the older adult population while they are in medical school they develop worsening attitudes about that population, their empathy decreases, and their negative regard for the population carries over into their future practices (George, Stuckey & Whitehead, 2014). These attitudes that are generated ultimately influence the care that is provided to older patients from health professionals. Many medical students have reported that they feel as though their communication with the elderly is time consuming, challenging, lacking intellectual stimulation, and complex (George, Stuckey & Whitehead, 2014).

In an effort to change the way medical students feel about the elderly population, a variety of non-clinical interventions have been tried by schools including home visits, intergenerational programs, aging simulations, and community contact programs (George, Stuckey & Whitehead, 2014). From this previous research, it has been suggested that residential care settings and community based venues should be core teaching sites for medical students and residents. George, Stuckey & Whitehead, 2014, looked to see if a creative arts program would serve to modify medical students' feelings, on the basis that engaging in creative arts can enhance mood, emotions and other psychological states. The study had quantitative and qualitative results, which found that creative storytelling can significantly improve attitudes, and providing arts based education experiences for students can foster more positive attitudes by allowing a less formal relationship to evolve between the medical students and the elderly (George, Stuckey & Whitehead, 2014).

A similar pilot study was designed to change medical students' perceptions of dementia by having them partake in a museum based arts program in New York City (Childress & Chen, 2015). Medical students were paired with individuals diagnosed with dementia and their caregivers for a 90 minute session of activities including talking about the gallery works and creating their own art. After pre- and post-tests utilizing the Dementia Attitude Scale, students reported a positive change in attitude, with the most notable change being in comfort level (Childress & Chen, 2015).

Medical Students and Caregiver Stress

Few students aspire to a specialty focus in geriatrics, which leaves this population in the hands of PCPs, as previously mentioned. The needs and perspectives of a patient's

family or caregiver is an aspect of patient care that is often neglected in medical education (Bailey, Currin, Ellis & Hite, 2013). Bailey, Currin, Ellis & Hite, 2013, designed an educational intervention to increase students' awareness of the needs of the caregiver population. The intervention took place at a local hospital house for families and caregivers of adult patients being treated for critical medical issues. The researchers believed that the health professionals would be able to provide a higher quality of care for their patients if they had a higher awareness of the challenges their caregivers faced.

Students were assigned readings related to caregiver needs and had to prepare a 5 minute presentation on any topic pertaining to caregiving (Bailey, Currin, Ellis & Hite, 2013). After discussing their readings, the students also participated in interviews with family members or caregivers of the patients they were working with. After the interview, the students were instructed to recommend some form of self-care strategies to the family members or caregivers, based on their needs.

The results of this study showed that the students reported feeling more comfortable with including caregivers in the treatment of their patients. Seventy-four percent of the students involved indicated that the sessions enhanced their ability to relate to the patients and their caregivers (Bailey, Currin, Ellis & Hite, 2013). The feedback provided by the students after the study confirmed that they identified a need for more humanistic experiences in their training, and felt that the current study of caregiver-focused sessions filled that requirement. At present, minimal additional research has been conducted on the attitudes that medical students possess about caregiver stress and the burden that comes with taking care of a loved one.

Chapter 3: Method

Overview

Approval was obtained through PCOM's Institutional Review Board prior to the initiation of any study-related activities. To determine the difference in attitudes between 2nd and 4th year Doctor of Osteopathic medical students in regards to dementia and care-giver stress, medical students were asked to complete an online survey via Survey Monkey and Qualtrics, which provided quantitative data about the knowledge, empathy and confidence level they feel when working with the dementia population and their caregivers.

The central research question was:

- What empathy, confidence, and knowledge do medical students possess about working with and treating individuals diagnosed with Dementia or a Dementia related illness, and do these attitudes affect their perceptions on the caregiver stress present within this group?

Secondary research question was:

- Do medical students who are further along in the program (4th year) possess stronger negative empathy then students in the beginning stages of the program (2nd year)?

Design and Design Justification

The current study was a between-groups, cross-sectional correlational design, used to determine current medical students' knowledge, confidence, and empathy about dementia, and how those feelings correlate with their perceptions towards the stresses of caregiving for that population.

Participants

Approximately 215 2nd and 4th year students were recruited from Philadelphia College of Osteopathic Medicine (PCOM) Doctor of Osteopathic Medicine program and Rowan University School of Osteopathic Medicine. To access the students at PCOM, the researcher collaborated with faculty members of the DO program to provide the survey to the 2nd and 4th year students. Fourth year students were provided with the survey via email, as were second year students, during class when appropriate. A recruitment email was sent out to all 2nd and 4th year medical students with access to the survey link. The researcher also reached out to Rowan University School of Osteopathic Medicine via email to ask if they would be interested in participating in the study. The researcher submitted the current study through the Rowan University IRB, through which it was approved. After approval, an email was sent to all 2nd and 4th year medical students at the school, giving them access to the survey. The students participating in the research were obtaining their Doctorate in Osteopathic Medicine, and were currently enrolled full time in their program. All students in the program had the same opportunity to participate in the study; all received a link with the survey attached via email from Survey Monkey or Qualtrics.

Eligible participants were at least 18 years old and were fluent in English. They had to be enrolled either in a Doctor of Osteopathic Medicine or in a Doctor of Medicine program full time. Eligible participants have not graduated from the program. Participants were excluded if they were not full time students, or if they were in any year other then 2nd or 4th year. Field experience was not required to participate in this study.

Measures

A 64-question survey was organized by the investigator to examine the current knowledge, empathy and confidence of 2nd and 4th year DO students for the dementia population and their respective caregivers. Demographic questions were asked of the study participants including year currently enrolled in the program, specialty, age, and the speciality they plan to pursue upon graduation.

To address the medical students knowledge of dementia, they were given the Knowledge in Dementia Scale (Elvish, Burrow, Cawley, Harney, Graham, Pilling, Gregory, Roach, Fossey & Keady, 2014). The Knowledge in Dementia Scale contains 16 items on a 2 point rated scale (agree/disagree). The scale, which involves 27 items, was originally developed in the United Kingdom for a training seminar. It was distributed to one hundred and fifteen dementia direct care personnel. Participants were required to be staff members working within the general hospital on one of the six wards; the majority of the patients were over the age of 65, including complex care, trauma orthopedic, and orthopedic wards. Of the 115 participants, 41% of the sample were nurses; 15% were foundation year 1 doctors; 15% were physiotherapists or occupational therapists, and 11% were health care assistants. Eleven items were removed, leaving a revised 16 item version. Items are scored with 2 options; agree responses are given a 1 point score and disagree responses are given a score of 0. The higher the overall score, the higher the representation of knowledge. A Cronbach's alpha for the scale of .72, and a Kaiser–Meyer–Olkin score of .70, measures sampling adequacy for each variable in the model and for the complete model, suggests good internal consistency and an adequate sample. Examples of items in this scale include statements such as "People with dementia will

eventually lose all their ability to communicate,"and "A person with dementia is less likely to receive pain relief than a person without dementia when they are in hospital."

The participants were also given the Jefferson Scale of Empathy-Medical Student Version to look for empathy possessed by medical students. A preliminary version of the Empathy scale was developed, based on a review of literature, and included 90 items answered on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) (Hojat, Mangione, Nasca, Cohen, Gonnella, Erdmann & Magee, 2001). The final version on the scale consisted of 20 items after a psychometric analysis. Of the 20 retained items, 17 with positive factor structure coefficients were directly scored on the previously mentioned Likert ranges. The other 3 items that had large negative factor structure coefficients were reverse scored. The alpha reliability estimate for residents was 0.87 and for students it was 0.89; both are in an acceptable range for scores (Hojat, Mangione, Nasca, Cohen, Gonnella, Erdmann & Magee, 2001). The findings that the Empathy scale scores yielded a higher correlation with the external criterion measures that were more conceptually related to physician empathy (e.g., Empathic Concern, Sympathy, Compassion, Warmth) than other less relevant criterion measures (e.g., Self-Protection, Clinical Neutrality) provided evidence in support of the criterion-related validity of the Physician Empathy scale (Hojat, Mangione, Nasca, Cohen, Gonnella, Erdmann & Magee, 2001). Psychometric findings showed support for construct validity, criterion-related validly (convergent and discriminant), and internal consistency reliability (coefficient alpha).

Additionally, the Confidence in Dementia Scale was administered to assess the medical students' own perceived confidence in working with this population. The Confidence in Dementia Scale is a 9 item self-report questionnaire on a 5 point Likert scale,

with anchored ratings of ‘not confident’, ‘somewhat confident’, and ‘very confident’ (Elvish, Burrow, Cawley, Harney, Graham, Pilling, & Keady, 2014). The Cronbach alpha value was 0.91 and the overall KMO was 0.90, suggesting that the scale had good internal consistency. Additionally, the scale shows good content validity which was determined after discussion with the authors. Based upon pre- and post-test scores on this scale, the test has good criterion validity (Elvish, Burrow, Cawley, Harney, Graham, Pilling, & Keady, 2014). Examples of items in this scale include, “I feel able to understand the needs of a person with dementia when he or she cannot communicate well verbally,” “I feel able to interact with a person with dementia when he or she cannot communicate well verbally,” and “I feel able to manage situations when a person with dementia becomes agitated.” This scale is being used to assess the confidence level that medical student have towards working with and treating the dementia population. Working with this population can be more difficult than working with others, and addressing their confidence level about this is important when looking at their attitudes.

Participants read a small vignette; which describes a typical experience had by caregivers when attending to the needs of someone with dementia. After reading the vignette, the participant answered three questions about the stress of the caregiver, based on a Likert scale; these questions include how stressful they perceive that situation to be for the caregiver, if they feel they could have been of help to the caregivers, and whether or not they agreed with the ultimate decision of the doctor.

Procedure

The design of this study is a correlational factor-relating quantitative study, focusing on collecting information through survey. As long as the students filling out the

survey did not meet exclusionary criteria, their surveys were used in the results of the study. During the demographic page at the beginning of the survey, the individual chose the year in the medical program in which they were currently enrolled. If any year other then 2nd and 4th year are selected as their current year in the program, the individuals were directed to a different page informing them that they were not eligible for the study.

The medical students at PCOM were provided with a link to complete the survey either in class or through email. Additionally, administration was consulted for help with providing the link to 4th year students ready for graduation. The researcher reached out via email to the appropriate individual at Rowan University School of Osteopathic Medicine and asked for permission to circulate an email to their medical school student body for participation in the study. When possible, the link was provided to the individuals in person, and when not, the link was sent via email. In the body of the email, the recipient saw a description of the study, and a statement asking for participation in the study. The email asked the student for his or her participation in a study that would take, at most twenty minutes to complete. A brief description of what the participant would be doing was listed, along with a link to the survey in Survey Monkey or Qualtrics. By clicking the link to the survey, the participant consented to participate in the study. They were informed they could drop out at any time, and no identifying information was required or asked of them, unless they would like their email address to be placed in a raffle for a gift card at the end of the study. The raffle was conducted separately from the survey, in order not to link the email addresses to the specific surveys.

If the link were clicked, the participants were taken to a survey on Survey Monkey. There was a statement which allowed them to affirm that they were second or

fourth year medical students and, therefore, eligible to participate in the study. Basic demographic information was asked, which they had the option to answer or not. The participants were presented with a list of statements, which they answered on a Likert scale. After the participants got to the end of the page, they were asked to hit the submit button. At that time, they were prompted to enter their personal information if they wished to be entered into a raffle for one of ten, twenty dollar gift cards. Once completed, the results were sent to the researcher, and the participants were taken to a debriefing page. The participants were thanked for participating in the study, and provided links to services, in the event they felt a need for it. Contact information for the principal investigator and student investigator were also provided.

Statistical Analysis

A Power analysis for a MANOVA with two levels and two dependent variables was conducted in G*Power to determine a sufficient sample size using an alpha of 0.05, a power of 0.80, and a medium effect size (f = 0.25). Based on the aforementioned assumptions, the desired sample size is 158. To account for dropouts and incomplete surveys, 250 subjects were required.

Three statistical tests were completed. According to Weinfurt (1995), the Bonferroni inequality states that the overall alpha will be less than or equal to the sum of the alpha levels from those tests. Therefore, in order to keep the alpha set at $\alpha = 0.05$, the alpha level for each test was set at $\alpha = 0.025$.

Hypothesis I: 4th year medical students will score knowledge based questions from the Knowledge of Dementia Scale higher than 2nd year medical students. To test this hypothesis, a *t-test*, with medical students as the independent variable with two levels

(2nd year or 4th year) and knowledge about dementia as the dependent variable, will be conducted.

The following assumptions are made when using a *t-test*. The first assumption is that the scale of measurement applied to the data collected follows a continuous or ordinal scale, such as the scores for an IQ test. Second, the sample used should be collected from a representative, randomly selected portion of the total population. The third assumption when using a t-test is that the data, when plotted, result in a normal distribution, bell-shaped distribution curve. To help account for the 3rd assumption, the 4th assumption states that a reasonably large sample size is used. A larger sample size means that the distribution of results should approach a normal bell-shaped curve. Last, there should be homogeneity of variance. Homogeneous, or equal, variance exists when the standard deviations of samples are approximately equal.

Hypothesis II: 2nd year medical students will score statements about their levels of confidence working with these patients from the Confidence in Dementia Scale higher than 4th year medical students, and medical students in the beginning stages of their program (2nd year) will not have empathy towards the dementia population, as measured by the Jefferson Scale of Physician Empathy-Medical Student Version, that is differing from students who are further along in the program (4th year). To test this hypothesis a Multivariate analysis of variance (MANOVA) with medical students as the independent variable with 2 levels (2^{nd} year or 4^{th} year) and empathy and confidence about dementia scores, including standard deviation, t-score and raw scores, as the 2 dependent variables was performed.

In order to run an F test for MANOVA, a test of assumptions was conducted to determine that they have been met. The F test requires that the dependent variables are correlated; therefore, a Pearson product-moment correlation coefficient was used to determine if knowledge of dementia and confidence in working with dementia are linearly related. However, if there is a high correlation between the dependent variables, $r \geq 0.7$, then there is multicollinearity and the variables needed to be combined into a single measure. There are 4 assumptions made by the F test. The F test assumes a normal distribution in the dependent variables, and is robust to non-normality. Due to this, a test for outliers was run prior to performing the MANOVA, and outliners were transformed or removed. If extreme outliers were impacting the mean, a closer look at the data from the participant(s) was performed.

The F test also assumes homogeneity of variances and covariance for the dependent variables. In order to test for homoscedasticity, a Levene's Test of Equality of Error Variances was used. Another assumption of the F test is that there is homogeneity of covariance. To test for homogeneity of covariance, a Box's Test of Equality of Covariance Matrices was used. The multivariate test statistic utilized was determined by any violations of assumptions for the F test.

As Wilks' lambda is frequently recommended, investigator utilized this statistic unless there are unequal sample sizes for the two levels of my independent variable or if there is heterogeneity of covariance; if either of these conditions is present the investigator will utilize Pillai's trace as it is the most robust F statistic (Sheskin, 2007).

Hypothesis III: Medical students who report a higher rate of positive empathy, as measured by the Jefferson Scale of Physician Empathy-Medical Student Version, about

dementia will rate the caregiver stress vignette as more stressful than those students who responded less empathically about the dementia population. To test this hypothesis, a Pearson correlation (r) was conducted to measure the degree and direction of linear relationship between these two variables.

When conducting a correlation, certain assumptions must be tested to assure any result is valid. Specifically, the variables being examined must have a linear relationship. A second assumption that must be met is homoscedasticity, or that the variance of the dependent variable is the same for all levels of the predictor.

Chapter 4: Results

Participants

To examine the differences between 2nd and 4th year DO students on their knowledge, empathy, and confidence in working with the dementia population, as well as their caregivers, a group of volunteer participants were collected by sending out a survey via email. This email utilized a Survey Monkey internet hyperlink for all PCOM participants, and a Qualtrics internet hyperlink for all Rowan SOM participants. The Survey Monkey survey for PCOM students was open for 10 months, and during that time three email blasts were sent, requesting participation. The Qualtrics survey for Rowan students was open for 4 months, and during that time three email blasts were also sent out requesting participation. At the closing of the surveys, it was found that 152 individuals had opened the Survey Monkey link, and 63 individuals opened the Qualtrics link, making a combined total of 215 surveys opened. Of the 215 respondents, 7 did not meet inclusion criteria (i.e. not a 2nd or 4th year DO student), and 50 did not complete the survey or had omitted items. The data for these 57 were omitted from the data analysis because of missing data and because of not meeting inclusion criteria, thus leaving 165 individuals who completed the survey and met inclusion criteria.

Of the 165 individuals who completed the survey and met inclusion criteria, 121 were students at Philadelphia College of Osteopathic Medicine, and 44 were students at Rowan University School of Medicine. A demographic breakdown of the distribution between 2nd and 4th years of the 165 individuals who completed the survey is shown in Table 1.

Table 1

Year of medical school participants meeting inclusion criteria

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2nd Year	78	47.3	47.3	47.3
	4th Year	87	52.7	52.7	100.0
	Total	165	100.0	100.0	

Ages of students ranged from 18 to greater than 35, with ages 23-29 making up 89.7 percent of individuals who completed the survey. A breakdown of age ranges can be seen in Table 2.

Table 2

Age of participants meeting inclusion criteria

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-22	1	.6	.6	.6
	23-25	70	42.4	42.4	43.0
	26-29	77	46.7	46.7	89.7
	30-35	13	7.9	7.9	97.6
	>35	4	2.4	2.4	100.0
	Total	165	100.0	100.0	

A demographic breakdown of the specialties in which the 165 individuals who completed the survey are shown in Table 3.

Table 3

Specialties of participants meeting inclusion criteria

	Frequency	Percent	Valid Percent	Cumulative Percent
Anesthesiology	3	1.8	1.8	1.8
Family Medicine/General Practitioner	24	14.5	14.5	16.4
Neurosurgery	2	1.2	1.2	17.6
Pediatrics	20	12.1	12.1	29.7
Radiology	5	3.0	3.0	32.7
Dermatology	4	2.4	2.4	35.2
Internal Medicine	39	23.6	23.6	58.8
Obstetrics/Gynecology	6	3.6	3.6	62.4
Physical Med/Rehabilitation	3	1.8	1.8	64.2
Psychiatry	6	3.6	3.6	67.9
Surgery	9	5.5	5.5	73.3
Emergency Medicine	15	9.1	9.1	82.4
Neurology	7	4.2	4.2	86.7
Opthalmology	1	.6	.6	87.3
Pathology	1	.6	.6	87.9
Public Health	1	.6	.6	88.5
Urology	2	1.2	1.2	89.7
Undecided	11	6.7	6.7	96.4
Other	6	3.6	3.6	100.0
Total	165	100.0	100.0	

Of the 165 students who participated and completed the survey, 50.2% were in one of the three ‘humanistic’ fields of medicine (Internal Medicine, Family Medicine,

and Pediatrics). Only 4.2% reported that their intended specialty was Neurology, one of the most important specialties for individuals with dementia.

Participation in the study was on a voluntary basis and all participants remained anonymous. The only identifying information obtained was the aforementioned demographic data.

Hypothesis I

An independent-samples t-test was conducted to determine the effect of current enrolled year in medical school on the amount of knowledge they have about dementia. There was not a significant difference between the 2nd year medical students (M = 12.1154; SD = 1.39555) and the 4th year medical students (M = 12.2989; SD = 1.12182) on their amount of dementia knowledge, as measured by the Knowledge of Dementia Scale; t (163) = -.935, p = .351, d = 0.14. The results suggest that the advance in years in a medical program does not increase the amount of knowledge obtained by individuals on the topic of dementia.

Hypothesis II

A multivariate analysis of variance (MANOVA) was run with independent variables year in medical school (2nd vs. 4th year), and dependent variables of confidence and empathy. Box's M was not significant for the MANOVA (p = .147), suggesting that there is overall homogeneity of covariance matrices. Wilks' Lambda was significant, suggesting that the overall MANOVA is significant (Wilks'Λ = .926; F(2, 162) = 6.51, p < .001). Additionally, the partial eta squared is .074, suggests a small to moderate effect size. When examining the univariate tests, the Levene's test for the empathy dependent measure is not significant (p = .842), but is significant for the confidence dependent variable

(p = .024). This suggests heterogeneity of variances for the confidence variable. When looking at the empathy comparison, it is statistically significant (F (2, 163) = 5.38, p = .022), and when using the MANOVA, this has a small effect size (partial eta squared = .032). The univariate analysis of variance for the confidence variable was also statistically significant with a small effect size (F (1, 163) = 4.72, p = .031; partial eta squared = .028). However, due to the unequal variances for the confidence variable, an independent sample *t-test* was computed in order to account for the unequal variances. With a more conservative cut-off for significance when accounting for heterogeneity of variance, the independent samples *t-test* continued to suggest a significant difference between groups (t (145.44) = -2.14, p = .034). A Cohen's d was calculated to determine the effect size of the independent samples t-test for the confidence variable, and a small effect was found (d = 0.34). Overall, it is suggested that both empathy and confidence are statistically different among 2nd and 4th year medical students.

Hypothesis III

A Pearson product-moment correlation coefficient was computed to assess the relationship between students' levels of empathy, as measured by the Jefferson Scale of Physician Empathy-Medical Student Version, and perceived levels of stress experienced by the family members in the vignette as reported by the participants. A moderate sized positive correlation was found between the variables, r (165) = 0.352, p = .000, thus the hypothesis was accepted. Overall, there was a strong positive correlation between level of empathy and level of stress reported, based on the vignette. Increases in empathy were correlated with increases in the stress experienced by the family in the vignette.

Chapter 5: Discussion

This study sought to identify the relationships between knowledge of dementia, confidence in working with dementia, and empathy in 2nd and 4th year DO students and examined how progressing through medical training changes the confidence and empathy levels within students and whether or not knowledge of dementia increases over time. The notable difference between 2nd and 4th year medical students is the exposure to different populations while on rotations, including the geriatric population. If all hypotheses had been accepted, it would have been suggested that knowledge improves with experience, confidence decreases with experience, empathy remains the same, and student with stronger empathy relate more closely to perceived stress among the caregivers of individuals with dementia. Such findings would have suggested that interactions with the geriatric population can lower one's confidence, one's ability in terms of being able to provide effective care over the course of treatment. However, one's knowledge of dementia would increase due to increased exposure and continued learning through rotation placements. In addition, showing stronger empathy would make an individual more likely to understand the caregiver stress vignette, and acknowledge the caregiver's concerns in regard to medical procedures. The lack of significance across some of these findings points to the need for increased education and awareness of medical students' knowledge, confidence and empathy when working with this population.

Of the 165 participants, 50.2% reported that their intended specialty upon graduation will be Family Medicine, Internal Medicine or Pediatrics, and only 4.2% chose Neurology. This result is consistent with previous literature which has reported a decline in individuals choosing one of the 'brain related' fields to enter , including child neurology,

medicine-neurology, medicine-psychiatry, neurodevelopmental disorder, neurosurgery, adult neurology, pediatric triple board, psychiatry, psychiatry-family medicine and psychiatry-neurology (Kamour, Han, Mannino, Hessler & Kedar, 2016) . With this in mind, approximately 50% of the participants are choosing to go into one of the more humanistic fields and one that is often the first to treat individuals with dementia.

The training pathway for Geriatricians, those who specialize in the care of older adults varies, but typically starts with a specialty in either family medicine or internal medicine. After successful completion of these residencies, they must complete a fellowship in geriatrics. As of 1999, certain medical residency programs were required to incorporate a geriatrics training component into their programs (Weiss & Fain, 2009). These programs included Anesthesiology, Emergency Medicine, Family Medicine, Internal Medicine (general), Intern Medicine (all subspecialties), Neurology (pain management), Neurology (vascular neurology), Orthopedic surgery, Physical Medicine and Rehabilitation, Psychiatry, Surgery (critical care), and Urology.

The overall findings of this study suggest that there is no difference in the amount of dementia knowledge acquired during the course of medical education from 2nd and 4th year students. There was no statistical difference between the knowledge of dementia in 2nd and 4th year students. Other findings from the study suggest that confidence is higher in 4th year medical students than 2nd years; however, empathy is higher in 2nd years. This supports previous research conducted by Hojat et al.,(2009) which showed that empathy levels decrease during the course of medical education. In addition, higher empathy scores correlated with students' perceived higher levels of caregiver stress reported in response to the clinical vignette. When the students exhibited strong empathy, they were

able to understand the stressful scenario for the caregivers in the vignette, and challenge the decision to perform surgery on the elderly patient with dementia.

Despite rejecting hypothesis I, that there would be a difference in knowledge between 2nd and 4th year medical students, valuable conclusions may be drawn from this information, and the results suggest that the focus on the geriatric population within medical education could be enhanced. Current literature notes that when additional information is provided to students about topics such as dementia, they demonstrate an increased knowledge and skill sets for working with them (Isaacson, Safdieh & Ochner, 2011). This could translate to increased confidence in being able to treat individuals with dementia as patients, as was demonstrated in the current study.

Knowledge of Dementia

The World Health Organization has called for a greater dementia awareness and education in response to the increasing global population of this particular group and their need for services (Annear, Toye, Eccleston, McInerney, Elliott, Tranter, Robinson, 2015). Working with this population requires a specific skill set and knowledge base to best serve them and their unique needs. The need for physicians willing to take on this task is a great one because the number of medical students choosing to go into brain related programs is dropping (Kamour, Han, Mannino, Hessler & Kedar, 2016). Through the course of learning and working in rotation sites, which enable access to the geriatric population, it is thought that the knowledge level would increase with exposure. However, it appears that 4th year students demonstrate no additional knowledge in dementia facts than 2nd year students. With a possible top score of 16, the 2nd year medical students scored a mean of 12.12 and the 4th year students scored a mean of 12.30. Previous re-

search using the Knowledge in Dementia Scale looked at various health care professionals' pre- and post-test knowledge of dementia after completing a training specifically intended to enhance dementia knowledge (Elvish, Burrow, Cawley, Harney, Graham, Pilling, Keady, 2014). The investigators found that the median pretest score was 13 and the post-test score was 15. Additionally, they rolled out a second phase of the training in 2018, using the same study design (Elvish, Burrow, Cawley, Harney, Pilling, Gregory & Keady, 2018). Once again, they found pre-test median scores of 12 and post-test median scores of 14. Overall, a broad range of healthcare providers benefited from extra education about dementia.

Garrie, Goel, & Forsberg (2016), who also utilized Rowan University School of Osteopathic Medicine students as study subjects, found that exposure to the dementia population had an impact only on students' knowledge on two particular questions, which were "people with ADRD can enjoy life" and "we can do a lot now to improve the lives of people with ADRD," with ADRD being defined as Alzheimer's disease and related dementias. This study utilized a poetry workshop to bring individuals with dementia from a dementia care unit and medical students together in a social setting. Findings from this study suggest that change in knowledge may occur only when direct experience is provided to medical students to increase knowledge.

Confidence in Dementia

Working with the dementia population can be challenging and requires a unique skill set and confidence level. Dementia has particular difficulties when it comes to end of life care and treatment. A 2013 study on medical students, nurses, and pharmacy students' attitudes about and confidence in palliative care of dementia patients found that

medical students were more likely to report low confidence in discussing non-medical aspects of dying (De Witt Jansen, Weckmann, Nguyen, Parsons & Hughes, 2013). Medical students also reported low confidence with aspects of medication-related care. Although their attitudes were positive, their confidence in providing care remained challenging.

The current study found that 4th year medical students had higher rates of confidence in their ability to provide good care and treatment to patients with dementia, than 2nd year students. This difference could be accounted for in multiple ways. Increased exposure to the different demands that come with care of the dementia population may provide additional insight into the treatment course, thus making medical students feel more confident in their abilities to be of help. Additionally, in working with physicians during rotations who feel confident and comfortable treating that population may also increase 4th year medical students' confidence levels.

Empathy

Research has shown that empathy among medical students declines by the third year of medical school, at the time in which students begin engaging in clinical rotations and participating in direct patient care (Hojat et al., 2009). Participants of this study were strategically chosen from the 2nd and 4th years because they represent the two main groups of medical students, before rotation (pre-clinical) and during clinical rotations. This study looked to see if a difference emerged between the two groups, possibly suggesting that direct care may influence the empathy levels of students.

Empirical research suggests that there are a number of personality attributes, which include empathy, that are predictors of patient outcomes (Hojat, DeSantis, Shan-

non, Mortensen, Speicher, Bragan & Calabrese, 2018). Instilling and cultivating empathy is among the goals of medical education which is endorsed by professional medical organizations. For instance, the American Board of Internal Medicine has recommended that humanistic qualities, such as empathy, should be instilled and assessed as an essential part of the physical education process (Hojat, DeSantis, Shannon, Mortensen, Speicher, Bragan & Calabrese, 2018).

The present study supports the notion that a change in empathy occurs during the course of medical education, based on the findings that 4th year medical students scored lower in empathy than 2nd year medical students. These findings suggest that there is a shift in the understanding of pain and suffering of the patient, as well as the capacity to communicate that understanding and possess an intention to help (Hojat, DeSantis, Shannon, Mortensen, Speicher, Bragan & Calabrese, 2018).

Caregiver Stress

Effective treatment and care of all forms of dementia requires a partnership between the physician and caregiver of the individual (Kurz, 1998). The caregivers play a crucial role in the day to day care and management, and they should be looked at as part of the care team. Caregivers provide information to the physician on their loved ones cognitive, functional, and behavioral symptoms, as well as any concern for medical issues. There are many burdens suffered by caregivers in an attempt to better care for someone with dementia, including physical, emotional, financial and psychological burdens (Kurz, 1998). When there is a strong, effective physician-caregiver alliance, physicians are able to stay fully informed about patients, which places them in the best possible position to prescribe individualized treatment (Kurz, 1998). The clinical vignette in

this study looked at the communication and empathy between a physician and the caregivers of an individual with dementia. Empirical research has indicated that cognitive complications are common after surgery in the elderly, with several studies showing a risk of irreversible cognitive impairment after surgery in the elderly, especially for those already diagnosed with dementia (Steinmetz & Rasmussen, 2018). The present study indicated that students who scored higher in empathy also rated the clinical vignette as more stressful for the caregivers, which shows higher recognition and understanding of the caregiver burden. In addition, the results indicated that students with higher levels of empathy did not agree with the decision of the doctor to perform the surgery, thus disregarding the family's opposition. The better the understanding and ability to communicate that understanding the medical students had, the more willing were they were to disregard the potential inclination to go ahead with the surgery and consider other factors.

Implications

There are several implications of this study that may help guide future research and areas for discussion, not only in the field of medical education but also in the dementia field. This study has the potential to help increase knowledge in the area of medical students' feelings and understanding of caregiver stress. As previously mentioned, there is little research in the area of medical students' knowledge and attitudes towards the stress experienced, not only by dementia caregivers but also by caregivers of any chronically ill or medically compromised population. Knowing how graduating medical students feel and relate towards this increasingly large issue will serve only to benefit that population, and possibly help guide medical schools in their training of our future physicians. Given the importance of empathy, in this regard, the current study supports the use

of the Jefferson Scale of Empathy as a means to assess medical students' sensitivity to the stress of caregivers of individuals with dementia.

Another area of benefit from these findings would include looking at the change in empathy that occurs within the different years of medical students because there is currently conflicting research. Current research shows that medical students experience an increase in negative feelings towards the dementia population once they begin working with them during rotations in their medical programs; however, other research shows a decrease in negative feelings once exposed to that group. All research can agree on one aspect though, which is that the change, whether positive or negative, occurs when rotations and exposure to the population occur in the 3rd academic year of the program, which is the introduction to clinical medicine.

Medical training, as with training in any particular area, prepares individuals to perform competently and comfortably within their chosen careers. Although counterintuitive to this thought process, medical students and residents have reported in previous research that the more exposure to the dementia population they have, the less comfortable and less confident they feel in managing and treating this population. This study aims to contribute knowledge to the concept that exposure does not always mean increased comfort level, knowledge or empathy.

This study has the potential to help inform medical programs about students' feelings towards patients with dementia and about their caregivers and may provide insight into how to better help serve that population. Students may be hesitant to report, in person, that they feel uncomfortable about working with the geriatric population. With the numbers of individuals aged 70 years and older increasing, students of most medical spe-

cialties are likely to encounter this population. Students being able to address these difficulties earlier in medical training rather than waiting until they are residents or practicing physicians can help boost confidence and ensure the best care standards are being met.

Research has shown that medical students with lower levels of altruism, which is closely related to empathy, are more likely to pick specialties that are higher paying, as opposed to choosing a specialty based on the primary desire to help others (Li, 2018). The number of individuals with a diagnosis of dementia is increasing rapidly in the near future; therefore, it is important that specialty care and services are also available to meet the needs of this population. Research by Compton, Frank, Elon & Carrera, 2008, has found that over the course of medical school, only 30% of the students who were initially interested in primary care were still interested and that they intended on that becoming their specialty in their senior year. They found that most students changed their specialty choices, regardless of their initial interests (Compton, Frank, Elon & Carrera, 2008). Often times, individuals are unaware of what they do not know, which can affect the decisions they make or paths they choose to follow. Medical students may benefit from earlier exposure or more intensive introduction to some specialties earlier in their medical education.

Limitations

It is important to note the limitations of the current study. First, the sample comprises a mixture of Doctor of Osteopathic Medicine students from two different institutions. Although similar in most aspects, their programs may have slight differences in sequence of classes and specific material being taught. In addition, the number of participants was not equally distributed between the two schools, meaning that 73% were from

Philadelphia College of Osteopathic Medicine (PCOM) and 27% were obtained from Rowan University School of Medicine, lowering the generalizability.

After looking into the variations between the number of participants from PCOM and Rowan, it is to be noted that the enrollment sizes are different between the two institutions. For the Philadelphia College of Osteopathic Medicine 2017-2018 1st year class, approximately 270 individuals enrolled in the program. As for Rowan School of Medicine, the 2017-2018 1st year class had approximately 188 students. However, after looking at this data, the number of individuals who participated in the survey from the PCOM 2nd and 4th year students was approximately 22%, and the number of Rowan students who participated from the 2nd and 4th year's was 11%. Even with taking class size into consideration, there is still a difference between the two schools and the rate of participation, which could be accounted for due to the difference in school size and the timeframe of this study.

A second limitation of the current study involves the sample recruitment methodology because the current study utilized a non-probability sample to obtain data, given that respondents self-selected to participate in the survey. Additionally, all those that participated needed to have a working email account which they check regularly, in order to have access to the survey.

An additional limitation involves the time frame in which survey responses were collected. Through the course of data collection, the medical students at Philadelphia College of Osteopathic Medicine matriculated into their next year, or graduated from the school. The survey was sent to the new 2nd and 4th year students, with the understanding that they also represent students who are not on rotation, and are starting their last year of

rotation. Spanning different cohorts could affect the overall results of knowledge, confidence and empathy, because the two different groups may have had different experiences. Following the same group on students in a longitudinal study will allow for more a more detailed account of factors that contribute to changes over the course of medical training.

Future Directions

Although the current study provides useful information about the empathy of medical students towards dementia and caregiver stress, future research in this area should be conducted to look for specific attitudes or irrational thoughts that the medical students possess which contribute to this outcome. This study queried only whether or not empathy was stronger for 4th year medical students as opposed to 2nd year medical students. Future studies could look at specific thoughts and the origins of these thoughts. Along similar lines, a qualitative study on medical students' beliefs about the geriatric population may prove to be rather informative in a variety of areas of importance to this field.

As previously mentioned in this paper, the number of medical students choosing to specialize in a brain related specialty of medicine is increasingly lower than in previous years. At the current time, the medical specialties of neurology and psychiatry, along with specialized geriatricians, play a prominent role in the diagnosis and treatment recommendations for the dementia population. Future studies may look to determine how these roles are changing in the larger realm of more integrated healthcare, as more interprofessional education occurs and treatment is delivered by treatment teams.

Empathy is an interpersonal skill which allows a patient of a medical practice to experience his/her doctor's consistent, professional concern for his/her feelings (Dyche,

2007). There is a fine line between unbounded and disciplined caring, which could compromise a physician's judgement. It can be hypothesized that some medical students may put up a metaphorical 'coat of armor' to protect themselves from the possibility of getting hurt due to caring and showing empathy to their patients. Empathy may require that physicians understand and manage their reactions to patients they find difficult to treat and work with and to forgive themselves and their patients when things do not go according to plan (Dyche, 2007). Empathy can be best looked at when examining the care of what some may consider to be the 'undesirable' patient, and often those with dementia are considered difficult to work with and treat. Incorporating increased interpersonal skills into the core curriculum for medical education would be a way to address the decrease in empathy and improve the overall relationships between medical students, soon to be physicians, and their patients.

This study examined the difference between two simultaneous years of medical school; future research should consider researching the same cohort over the course of their medical education. A longitudinal study of one group over 4 years may yield additional results about what changes for an individual through the course of the program, and when things specifically start to change.

Conclusion

Empirical studies have shown a decline in empathy during undergraduate and graduate medical education (Hojat, Vergare, Maxwell, Brainard, Herrine, Isenberg & Gonnella, 2009). Knowledge of dementia has the potential to grow with direct exposure to the population, along with increased confidence and empathy. By examining the knowledge, confidence, empathy and attitude toward caregiver stress of 2nd and 4th year

medical students, this study highlighted changes that occur or do not occur over the course of medical training. One of the outcomes of this study found that that there was no significant difference between 2nd and 4th year DO students in their knowledge of dementia. In addition, 2nd year students possessed higher empathy levels and lower confidence, but 4th year students possessed lower empathy but higher confidence. When students had higher rates of empathy, they exhibited increased recognition of the stress experienced by caregivers that, in turn, may contribute to a more holistic approach to patient care. Future studies could examine how to cultivate empathy during the course of medical education.

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